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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/810,804	03/29/2004	Chang-Rong Wu	WUCH3037/EM	9777

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EXAMINER
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TOLEDO, FERNANDO L

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 03/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/810,804	<b>Applicant(s)</b> WU ET AL.	
	<b>Examiner</b> Fernando Toledo	<b>Art Unit</b> 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 December 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### **Prior Art Rejections**

#### **Statutory Basis**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

#### **The Rejections**

Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beintner et al.

Beintner discloses a structure similar to that claimed by the applicant. Element 200 corresponds to applicant's substrate. Upon the substrate 200 a pad oxide film 201 and a pad nitride layer 203 are provided. (See column 4, lines 1-20). A hard mask layer or layers is then optionally provided so as to more efficiently etch trenches 202b down deep into the substrate. The reference does teach that the hard mask layer or layers can be composed of BPSG, BSG, FSG, PSG, or the like and amorphous silicon layers.

However, Beintner does not teach the specific order of the layers and why one would use the BSG and BPSG out of the others. The only issue then is the structure of the mask layer. The applicant has not indicated any critically for the various materials and the order of the materials. The mere selection of which known masking materials

and their order on the basis of the suitability of the intended use does not rise to the level of significant patentable subject matter as such selection would have been obvious to one of ordinary skill through routine experimentation. See In re Aller, 105 USPQ 233 (CCPA 1955) and In re Leshin, 125 USPQ 416 (CCPA 1960).

Consequently, as the prior art discloses that the masks are well known to be composed of layers which can include BPSG and BSG, it would have been obvious to one of ordinary skill in the art to modify or clarify Beintner and have the first mask layer be BPSG and the second be BSG as applicant has not shown criticality of the order and these materials are well know layers to be used in masks.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Beintner et al. as applied to claims 1 and 4 above, and further in view of Shimonishi et al.

Beintner teaches the features outlined above but lacks a discussion as to the annealing of the layers of the method prior to the trench making and after the application of BSG. Shimonishi teaches that baking of a mask containing the BSG, BPSG or PSG before etching or other processing prevents the mask from changing configuration upon etching. See column 8, lines 14-17 of Shimonishi. Therefore, it would have been obvious to one of ordinary skill in the art to us the teachings of Shimonishi to bake or anneal the mask of Beintner upon completion thereof and before the trench etching procedure.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Beintner as applied to claims 1 and 4 above, and further in view of applicant's admitted prior art.

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Beintner teaches the features outlined previously but lacks an explicit teaching of the manner of formation of the trenches using vapor of HF to etch in an anisotropic style.

Applicant's admitted prior art disclose that the hydrogen fluoride vapor can be effectively used to etch trenches wherein BSG is found in the mask structure.

Consequently, it would have been obvious to one of ordinary skill in the art to use the well know method of HF etching to etch the trenches of Beintner as this has been shown to be an effective manner of etching masks with BSG.

#### Response to Applicant's Arguments

The examiner has considered the applicant's comments and finds them persuasive. In light of a new reference, however, the examiner believes that the applicant's invention as recited in the claims is an obvious development from the prior art and generated the above non-final office action accordingly.

#### Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fernando Toledo whose telephone number is 571-272-1867. The examiner can normally be reached on Monday-Fridays 7-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Fernando Toledo  
Examiner  
Art Unit 2823

mss

A handwritten signature in black ink, appearing to read "Matthew Smith", is positioned above the printed name and title.

MATTHEW SMITH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800